

## **Astrophysics Education, Public Engagement, & Communications: Inspiring and Educating with NASA**

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As we envision the remarkable science and technology advances that will happen over the next 30 years, we must also anticipate how we will communicate those advances outside our academic and laboratory walls. Communication, public engagement, and education have always been cornerstones to NASA's mission, and must remain so in the future. With today's rapidly changing information and communications technology, it is impossible to know what the next three decades will bring. However, we anticipate that NASA will remain a leader of inspiration and continue to serve as a launchpad for science and technology education.

Any vision of the future of education, public engagement, and communications must begin with the goals we wish to achieve. The challenges are real: ~75 percent of U.S. 8th graders are not proficient in mathematics when they complete 8th grade (Schmidt, W.H. 2001), and there are measured gaps in achievement among ethnic and socioeconomic student populations (Hill, C.G. et al. 2008), and scientific literacy as a whole is decreasing. *The goal over the next 30 years should be for NASA to exploit its unique ability to inspire and educate, in order to return the U.S. to a leadership position in terms of the number of STEM careers and the level of science literacy among the populace.* This would require a multifaceted approach, reaching students in the classroom (formal education), individuals and families where they spend their free time (informal education), and the general public wherever we can (public engagement and communications).

Currently, new science education standards are emphasizing process- and project-based learning rather than strictly knowledge-based goals (which is embodied in the Next Generation Science Standards); in ten years, most schools will have adopted these. In 20 years, using these standards as a starting point, the schools will likely have embraced even more inquiry-based learning techniques; in 30 years, science classrooms might very well look more like a science collaboration than a typical classroom. Inquiry-based learning is already taking hold in informal settings as well. Predicting long-range communication and public engagement, especially via social media, is more difficult; but *NASA should maintain its stellar reputation in the world of social media* and continue to adapt quickly as information-sharing changes.

A key to success in future education and public engagement efforts will be *how well we reach new audiences, where they happen to be.* This can occur in the formal setting: As astronomy makes its way into other classrooms (language arts, history, art) and is taught in a cross-discipline manner in other science curricula (chemistry, geology, biology), it becomes infused seamlessly across the curriculum to engage all learners. Public engagement events and general online communications should continue to strive for new audiences, who will be both our future scientists and science advocates. In all cases, we should capitalize on the unique ability of astronomy to inspire, and of NASA's key role as the world's leader in technology development and scientific discoveries to revitalize U.S. interest and investment in STEM.